

**BY ORDER OF THE
SECRETARY OF THE AIR FORCE**

**AFI 11-2AE-3V3, CL-2
1 JUNE 2005**



Nursing Considerations

**AEROMEDICAL EVACUATION CREW (AEC)
CHECKLIST**

This checklist establishes procedures for Aeromedical Evacuation on mobility aircraft employed by Mobility Air Forces (MAF) to accomplish their worldwide missions.

This checklist complements AFI 41-307, *Aeromedical Evacuation Patient Considerations and Standards of Care*, and is printed on standard 8 ½" x 11" bond paper then trimmed to a unique size 4 ½" x 6 ½" that will fit the standard plastic aircrew checklist binders. Units may request copies of this checklist printed on a water proof based media (in the size outlined) from the OPR. This product reduces weight and eliminates the need for plastic inserts. Limit waterproof copies to aircrew only for use in-flight and training purposes.

This checklist is intended to provide quick and reliable references to aid the AEC while mission planning and for use in-flight. All AE crews will carry this annex.

This document is new

OPR: HQ AMC/A37VM (SMSgt Al Jean-Batiste)

Certified by: HQ USAF/XOO (Maj Gen Teresa M. Peterson)

Number of Printed pages: 17/Distribution: F

SECTION I: INTRODUCTION	1-2
SECTION II: CARDIAC ARREST PROCEDURES	3
SECTION III: CLINICAL REFERENCES	5
LAB VALUES	5
OXYGEN FORMULA	6
IV FLUIDS INFUSION FORMULA	8
MEDICATION ADMINISTRATION	8
GLASGOW COMA SCALE	9
SECTION IV: ASSESSMENTS PROMPTS	10
ACUTE ABDOMEN	10
ALTERED MENTAL STATUS	10
CHEST PAIN	10
PEDIATRICS	10
RESPIRATORY DISTRESS	11
TRAUMA	11
SECTION V: CHARTS	12
ADULT WEIGHT TABLE	12
INFLIGHT O2 CONVERSION TABLE	13
OXYGEN DELIVERY METHODS	14
ZULU TIME CHART	15

SECTION II**CARDIAC ARREST PROCEDURES: AEC****FIRST RESPONDER BEGINS BLS**

NOTIFIES CREW

OPENS AIRWAY

CHECKS BREATHING

CHECKS CIRCULATION

FN ASSESSES PATIENT/SITUATION
DIRECTS TEAM
STARTS IV
ADMINISTERS DRUGS

FN BRINGS IV FLUIDS AND SUPPLIES
BRINGS DRUG BOX
PREPARES DRUGS
RECORDS EVENTS
COMMUNICATES WITH AC

AET MAINTAINS AIRWAY
VENTILATES PATIENT
- Oxygen 100%/Bag-Valve-Mask

AET PERFORMS CARDIAC COMPRESSIONS

AET**OBTAINS EQUIPMENT**

- Cardiac Monitor/Defib
- Airway Management Kit
- Suction unit
- Cardiac Board (as required)

SETS UP

- O2/full liter flow/BVM
- Suction

CABIN COVERAGE**RELIEVES AECMs AS REQUIRED**

In an emergency or wartime situation, a provider must take reasonable and necessary action within their knowledge and experience to preserve life and health.

Advanced Cardiac Life Support (ACLS) trained AECMs will immediately start interventions following the most current American Heart Association (AHA) ACLS algorithms found in the emergency drug kits. An ACLS trained nurse will supervise the resuscitation unless an ACLS trained physician is available. All IV solutions will be either lactated ringers (LR) or normal saline (NS).

SECTION III**CLINICAL REFERENCES****LAB VALUES****ELECTROLYTES**

CALCIUM (CA)	8.5-10.3mEq/L
CHLORIDE (CL)	98-109 mEq/L
CREATININE	0.7-1.4mg%
GLUCOSE	65-110 mg%
POTASSIUM (K)	3.5-5.0 mEq%
SODIUM (NA)	136-147 mEq%
UREA NITROGEN	6-23mg%

BLOOD COUNTS**Chronic Low Hgb:**

8.5-10	Oxygen Available
7.0-8.5	Oxygen at 2L for flight
< 7.0	AE Validating Flight Surgeon

Post-Op Low Hgb (acute):

9.0-10	Oxygen Available
8.0-9.0	Oxygen at 2L for flight
<8.0	AE Validating Flight Surgeon

Patients with hemoglobin below 8.0 mg may be transported if the condition is chronic and stable, and not related to bleeding.

Patients with a hematocrit below 25% are not airlifted without concurrence of the Validating Flight Surgeon (VFS). Low flow O₂ is used continuously on patients with extremely low hemoglobin or hematocrit levels, as in dialysis and chemotherapy patients. An altitude restriction below 5000 feet may be ordered by the VFS.

PLATELETS	150,000-350,000/ μ l
WBC	5000-10000 / μ l

OXYGEN FORMULAS

OXYGEN: Oxygen is generally available by use of a liquid oxygen converter (LOX) system. The computations for determining oxygen requirements in flight are:

a. LOX CALCULATIONS: To calculate the mission's total LOX requirements:

1. Add the oxygen flow of each patient (including ventilator use) to get a total oxygen flow (in LPM).
2. Add the estimated flight leg times to the estimated ground times to get a total mission time (hours).
3. Multiply the total mission time (hours) by 60 to get a total mission time (minutes)
4. Multiply the total mission time (minutes) with the total oxygen flow (LPM) to get the mission's total gaseous oxygen requirement (liters-gaseous)
5. Since 1 liter of LOX equals 804 gaseous liters of oxygen, divide the total gaseous oxygen requirement (liters-gaseous) by 804 to get the mission's total LOX requirement (liters-LOX)

For example, a mission has 5 patients on supplemental oxygen at 5 LPM and 2 patients on ventilators (one requiring a flow of 8 LPM and another requiring a flow of 12 LPM). The total oxygen flow is 5LPM + 5LPM + 5LPM + 5LPM + 5 LPM + 8LPM + 12LPM = 45LPM. If the estimated flight time is 8 hours plus 3 hours ground time; the total mission time is 11 hours. 11 hours times 60 minutes/hour gives a total mission time of 660 minutes. The total gaseous oxygen requirement is calculated at 660 minutes times 45LPM giving a total of 29,700 liters. Therefore the total LOX requirement is 29,700 liters gaseous oxygen divided by 804 liters LOX/liter gaseous oxygen for a total need of 37 liters of LOX for this mission.

b. The general conversion for cylinders is:

$$\frac{\text{Gauge pressure in psi minus the duration of residual pressure} \times \text{cylinder constant}}{\text{Flow Rate in LPM}} = \text{flow in minutes}$$

Residual Pressure = 200 psi
Cylinder Constant

D = 0.16	G = 2.41
E = 0.28	H = 3.14
M = 1.56	K = 3.14

EXAMPLE

Determine the life of an M cylinder that has a pressure of 2000 psi and a flow rate of 10 LPM.

$$\frac{(2000-200) \times 1.56}{10} = \frac{(2808)}{10} = \frac{(281)}{1} \text{ minutes or 4 hours and 41 minutes}$$

c. Any patient who develops a new requirement for oxygen in flight will require an entry of the AF IMT 3829, Summary of Patients Evacuated by Air, and DD Form 602/AF IMT 3899, AE Medical Record. The required minimal charting will indicate time started, flow rate, delivery type, maximum cabin altitude, and patient response. Complete DD Form 2852, AE Event/Near Miss Report.

IV FLUIDS INFUSION FORMULA

$$\frac{\text{TOTAL AMOUNT (ML)}}{\text{TOTAL TIME IN MINUTES}} \times \text{DROP FACTOR} = \text{DROP/MINUTES}$$

(drop factor = the number of drops/ml of the designated IV set to be used)

MEDICATION ADMINISTRATION FORMULA

$$\frac{\text{STRENGTH DESIRED}}{\text{STRENGTH ON HAND}} \times \frac{\text{AMOUNT DESIRED}}{\text{AMOUNT ON HAND}} = \frac{\text{DOSE TO BE ADMINISTERED}}$$

GLASGOW COMA SCALE

Adult		Child	
Eye Opening			
None	1	None	1
Opens to Pain	2	Opens to Pain	2
Opens to Verbal	3	Opens to Verbal	3
Opens Spontaneously	4	Opens Spontaneously	4
Verbal Response			
None	1	None	1
Incomprehensible	2	Moans to Pain	2
Inappropriate words	3	Persistent Cry to Pain	3
Confused	4	Inconsolable Cry to Pain	4
Oriented	5	Appropriate Words/Coos	5
Motor Response			
None	1	None	1
Extension to Pain	2	Extension to Pain	2
Flexion to Pain	3	Flexion to Pain	3
Withdraws to Pain	4	Withdraws to Pain	4
Localizes Pain	5	Localizes Pain	5
Obeys Command	6	Spontaneous Movement	6

Rule out and treat hypoxia! Refer to AFI 41-307 for interventions.

SECTION IV

ASSESSMENT PROMPTS

ACUTE ABDOMEN

Is patient pregnant? Which trimester? Consider ectopic

Pain onset, location, radiation, tenderness, fever?

Genito-urinary, vaginal or rectal bleeding / discharge?

Any recent trauma? MVA?

Record recent food/liquid intake and GI habits.

Examine all four quadrants, note if bowel tones present/absent.

ALTERED MENTAL STATUS

Causes: trauma, infection, CVA, shock, hypoxia, hypoglycemia, drugs, toxic exposure, seizures, tumor, electrolyte imbalance, etc.

CHEST PAIN

Consider MI, PE, CHF, APE, pneumothorax, pneumonia, bronchitis, etc.

PEDIATRICS

Assess airway: look for obstructions, drooling, trauma

Breathing: reaction? rate? adequacy of air movement?

Circulation: assess heart rate, capillary refill

Bradycardia means hypoxia. Ventilate!

Assess mentation, determine normal activity

Obtain history or present illness / rate of onset

Record recent intake and GI habits

Temperature: fever? Check glucose in poorly-responsive pt

Consider hypoxia, toxic exposure, sepsis, abuse, etc.

RESPIRATORY DISTRESS

Observe patient surroundings
Obtain pertinent medical history, allergies
Onset of event: was it slow or fast
Fever? Cough? Is cough productive, or different?
Medications: diuretics, pulmonary, cardiac
Assess respiratory effort, tidal volume, I:E ratio
Assess level of consciousness
Assess lung sounds, vitals, pulse oximetry
Is patient exhausted? Candidate for intubation?
Causes: COPD, CHF, trauma, toxic exposure, sepsis, etc.

TRAUMA

Assess scene safety and perform size-up
Assess mechanism of injury
Assess level of consciousness (**AVPU**: Alert, Verbal, Pain, Uncon.)
(A) Airway: obstructions? Protect C-Spine; apply oxygen
(B) Breathing: check rate, effort, adequacy of respirations
(C) Circulation / Pulses: BP capillary refill, severe bleeding?
(D) Disability: perform neuro assessment, GCS
(E) Expose patient and perform exam
HEENT: check pupils; tracheal deviation? Sub-Q air? JVD?
Assess chest: look for trauma, pneumo, check lung sounds
Evaluate abdomen, pelvis, extremities, back
Are there any medical causes? (eg: diabetes, CVA, MI, etc.)

SECTION V**CHARTS****ADULT WEIGHT TABLE**

Pounds	Kilograms	Pounds	Kilograms
1	.45	130	59
50	22.68	145	66
75	33.80	160	72.7
85	38.5	175	79.5
95	43	185	84
100	45.4	195	88.6
115	52.30	200	90.9

CONVERSION TABLE FOR INFLIGHT O₂ ADMINISTRATIONCABIN
ALT

10,000	30	36	44	51	58	65	73	80	87	94	100						
9,000	29	35	42	49	56	63	70	77	84	91	98	100					
8,000	28	34	40	46	54	61	67	74	81	87	93	100					
7,000	27	32	39	45	52	58	65	71	78	84	91	97	100				
6,000	26	31	37	44	50	56	62	69	75	81	87	94	100				
5,000	25	30	36	42	48	54	60	66	72	78	84	90	96	100			
4,000	24	29	35	41	46	52	57	64	70	75	81	87	93	97	100		
3,000	23	28	33	39	45	50	56	61	67	73	78	84	89	95	100		
2,000	23	27	32	38	43	48	54	59	64	70	75	81	86	91	97	100	
1,000	22	26	31	38	41	47	52	57	62	67	73	78	83	88	93	98	100
	21	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

EVEN THOUGH THE DELIVERED O₂ MAY BE AT 100% THE PARTIAL PRESSURE TO DELIVER 100% SEA LEVEL EQUIVALENT (SLE) CANNOT BE OBTAINED (EX: 100% O₂ AT 8,000FT ONLY PROVIDES 75% O₂ SEA LEVEL EQUIVALENT [SLE])

DESIRED SEA LEVEL EQUIVALENT (SLE) CANNOT BE OBTAINED AT THESE ALTITUDES.

TO USE TABLE, FIND DESIRED % O₂ ON BOTTOM ROW, THEN FIND THE CABIN ALTITUDE FROM THE LEFT COLUMN. WHERE THESE TWO INTERSECT IS THE % O₂ THAT MUST BE DELIVERED TO OBTAIN THE DESIRED SEA LEVEL EQUIVALENT (SLE). AFTER FINDING THIS VALUE, REFER TO THE CHART ON THE NEXT PAGE TO DETERMINE LITER PER MINUTE FLOW NECESSARY TO DELIVER THIS VALUE. REMEMBER IT IS DIFFERENT FOR EACH OXYGEN DELIVERY METHOD.

OXYGEN DELIVERY METHODS

METHOD	LPM	OXYGEN %
Nasal Cannula (Exact O2% depends on minute ventilations)	2	23-28
	3	28-30
	4	32-36
	5	40
	6	Max 44%
Simple Mask Must have > 5LPM to clear CO2 from mask	5	40
	6	45-50
	8	55-60
Partial Rebreather	6	35
	8	40-50
	10	60
	12	60
	15	60
Non Rebreather	6	55-60
	8	60-80
	10	80-90
	12	90
	15	90

EXAMPLE: The doctor orders 30% O2 per nasal cannula. You are flying at a cabin altitude of 6,000 ft. To deliver the ordered % you must give the patient 37% O2. To do this with a nasal cannula, you must set the flow meter to 4-5 LMP.

ZULU TIME CHART

	-12.	-11.	-10.	-9.	-8.	-7.	-6.	-5.	-4.	-1.	GMT.	+1.	+2.	+3.	+4.	+5.	+5:30	+7.	+8.	+9.	+9:30.	+10.	+12.
	New. Zealand.	Mid. way.	Hawai.	Elmen- dorf. (US)	PST (US)	MST. (US)	CST. (US)	EST. (US)	Puerto Rico.	Azores	Ireland, England.	Germany, Italy, Spain.	Turkey, Greece, Egypt.	Bah. rain.	Tehran	Kara- chi.	New. Del.	Thai. land.	Taipei. Phil- ipines.	Japan. Korea.	Alco. Springs (AUS).	Guam. Rich. mond. (AUS).	New. Zealand.
	0600.	0700.	0800.	0900.	1000.	1100.	1200.	1300.	1400.	1700.	1800.	1900.	2000.	2100.	2200.	2300.	2330.	0100.	0200.	0300.	0330.	0400.	0600.
	0700.	0800.	0900.	1000.	1100.	1200.	1300.	1400.	1500.	1800.	1900.	2000.	2100.	2200.	2300.	2400.	0030.	0200.	0300.	0400.	0430.	0500.	0700.
	0800.	0900.	1000.	1100.	1200.	1300.	1400.	1500.	1600.	1900.	2000.	2100.	2200.	2300.	2400.	0100.	0130.	0300.	0400.	0500.	0530.	0600.	0800.
	0900.	1000.	1100.	1200.	1300.	1400.	1500.	1600.	1700.	2000.	2100.	2200.	2300.	2400.	0100.	0200.	0230.	0400.	0500.	0600.	0630.	0700.	0900.
	1000.	1100.	1200.	1300.	1400.	1500.	1600.	1700.	1800.	2100.	2200.	2300.	2400.	0100.	0200.	0300.	0330.	0500.	0600.	0700.	0730.	0800.	1000.
	1100.	1200.	1300.	1400.	1500.	1600.	1700.	1800.	1900.	2200.	2300.	2400.	0100.	0200.	0300.	0400.	0430.	0600.	0700.	0800.	0830.	0900.	1100.
	1200.	1300.	1400.	1500.	1600.	1700.	1800.	1900.	2000.	2300.	2400.	0100.	0200.	0300.	0400.	0500.	0530.	0700.	0800.	0900.	0930.	1000.	1200.
	1300.	1400.	1500.	1600.	1700.	1800.	1900.	2000.	2100.	2400.	0100.	0200.	0300.	0400.	0500.	0600.	0630.	0800.	0900.	1000.	1030.	1100.	1300.
	1400.	1500.	1600.	1700.	1800.	1900.	2000.	2100.	2200.	0100.	0200.	0300.	0400.	0500.	0600.	0700.	0730.	0900.	1000.	1100.	1130.	1200.	1400.
	1500.	1600.	1700.	1800.	1900.	2000.	2100.	2200.	2300.	0200.	0300.	0400.	0500.	0600.	0700.	0800.	0830.	1000.	1100.	1200.	1230.	1300.	1500.
	1600.	1700.	1800.	1900.	2000.	2100.	2200.	2300.	2400.	0300.	0400.	0500.	0600.	0700.	0800.	0900.	0930.	1100.	1200.	1300.	1330.	1400.	1600.
	1700.	1800.	1900.	2000.	2100.	2200.	2300.	2400.	0100.	0400.	0500.	0600.	0700.	0800.	0900.	1000.	1030.	1200.	1300.	1400.	1430.	1500.	1700.
	1800.	1900.	2000.	2100.	2200.	2300.	2400.	0100.	0200.	0500.	0600.	0700.	0800.	0900.	1000.	1100.	1130.	1300.	1400.	1500.	1530.	1600.	1800.
	1900.	2000.	2100.	2200.	2300.	2400.	0100.	0200.	0300.	0600.	0700.	0800.	0900.	1000.	1100.	1200.	1230.	1400.	1500.	1600.	1630.	1700.	1900.
	2000.	2100.	2200.	2300.	2400.	0100.	0200.	0300.	0400.	0700.	0800.	0900.	1000.	1100.	1200.	1300.	1330.	1500.	1600.	1700.	1730.	1800.	2000.
	2100.	2200.	2300.	2400.	0100.	0200.	0300.	0400.	0500.	0800.	0900.	1000.	1100.	1200.	1300.	1400.	1430.	1600.	1700.	1800.	1830.	1900.	2100.
	2200.	2300.	2400.	0100.	0200.	0300.	0400.	0500.	0600.	0900.	1000.	1100.	1200.	1300.	1400.	1500.	1530.	1700.	1800.	1900.	1930.	2000.	2200.
	2300.	2400.	0100.	0200.	0300.	0400.	0500.	0600.	0700.	1000.	1100.	1200.	1300.	1400.	1500.	1600.	1630.	1800.	1900.	2000.	2030.	2100.	2300.
	2400.	0100.	0200.	0300.	0400.	0500.	0600.	0700.	0800.	1100.	1200.	1300.	1400.	1500.	1600.	1700.	1730.	1900.	2000.	2100.	2130.	2200.	2400.
	0100.	0200.	0300.	0400.	0500.	0600.	0700.	0800.	0900.	1200.	1300.	1400.	1500.	1600.	1700.	1800.	1830.	2000.	2100.	2200.	2230.	2300.	0100.
	0200.	0300.	0400.	0500.	0600.	0700.	0800.	0900.	1000.	1300.	1400.	1500.	1600.	1700.	1800.	1900.	1930.	2100.	2200.	2300.	2330.	2400.	0200.
	0300.	0400.	0500.	0600.	0700.	0800.	0900.	1000.	1100.	1400.	1500.	1600.	1700.	1800.	1900.	2000.	2030.	2200.	2300.	2400.	0030.	0100.	0300.
	0400.	0500.	0600.	0700.	0800.	0900.	1000.	1100.	1200.	1500.	1600.	1700.	1800.	1900.	2000.	2100.	2130.	2300.	2400.	0100.	0130.	0200.	0400.
	0500.	0600.	0700.	0800.	0900.	1000.	1100.	1200.	1300.	1600.	1700.	1800.	1900.	2000.	2100.	2200.	2230.	2400.	0100.	0200.	0230.	0300.	0500.

NOTE: For those areas that practice Daylight Savings Time; add one hour (+1) starting on the first Sunday in April through the last Sunday in October.

RONALD E. KEYS, Lt General, USAF
DCS/Air and Space Operations